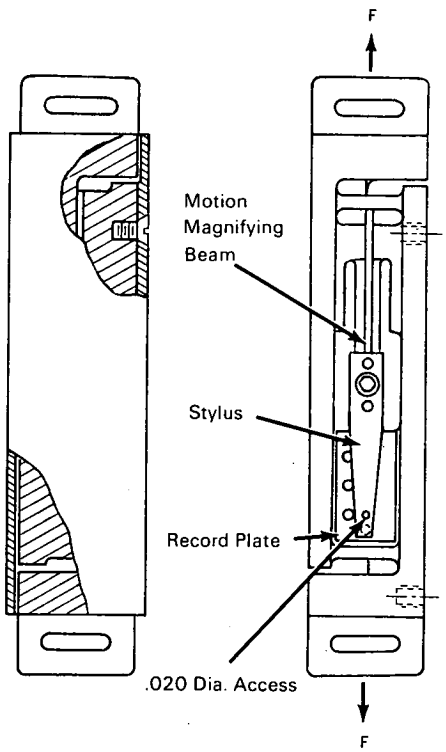
NASA TECH BRIEF

A Magnifying Scratch-Gage Force Transducer



Scratch-Gage Force Transducer Schematic

The problem:

To develop a miniature passive type transducer for applications where certain environmental conditions limit the use of conventional strain-gage transducers. The device must be small, load carrying and high in natural frequency.

The solution:

A single-component scratch-gage transducer has been designed which meets the required specifications and also incorporates a unique motion magnification scheme to increase the magnitude of the load measuring scratch approximately 15 times over that of conventional models.

How it's done:

The transducer shown in the schematic is constructed from a single piece of Vascomax-300 maraging steel with the exception of the stylus and recording plate; the stylus is made from Swedish blue steel and the stylus point, made from heat-treated tool steel, is pressed against a stainless steel record plate.

(continued overleaf)

Motion magnification for the recording scratch is obtained through the eccentric beam in the center of the transducer that changes translational motion to a rotational motion, with the effective center of rotation being at the half length of the eccentric beam. Two flexure beams are used at each end of the transducer for assuring pure translational motion in the direction of the applied force. Overall accuracy of calibration, achieved by dead weight loading and measurement of the scratch length, is within ±2 percent of the design load range.

Notes:

b. The motion magnifying scheme can also be used as a mechanical strain measuring device by rigidly attaching each end of the transducer to the specimen being loaded. In this application the input to the transducer would be a deflection which is proportional to the induced specimen strain.

2. Inquiries concerning this transducer may be directed to:

Clearinghouse for Federal Scientific
and Technical Information
Springfield, Virginia 22151
Price $3.00
Reference: TSP69-10212

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546

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